

## REMARKS

### *Status of the Application:*

Claims 1-45 are the claims of record of the application. Claims 1-45 have been rejected.

### *Telephone interview on February 9, 2009*

Applicant and the undersigned appreciate the Examiner's and his supervisor's attention and courtesy during the telephone interview held February 9, 2009 between the Examiner, SPE Doug Hutton and the undersigned. The invention, the cited references, background to the field at the time of the cited art, and the rejection under 35 USC 103 were discussed. Because of complexity of the field, no agreement was reached that verbal arguments presented would succeed in allowability of any of the claims. Agreement was reached, however, that so long as no claim amendments were presented, a response after final would be entered and considered.

### *Response after final should be entered and considered*

Applicants recognize that the Examiner has discretion in considering a response after final rejection, and believe that the present response is sufficiently focused to be appropriate for entry.

The remarks in this response directly address Examiner's concerns regarding the claims by commenting on Examiner's presentation of new issues. No new amendments have been introduced. No new issues have been raised. Agreement was reached in the Interview that so long as no claim amendments were presented, a response after final would be entered and considered. Thus, even if the Examiner is not persuaded to allow any of the claims in this application, this response after final places the application in better condition for appeal. Entry is therefore respectfully requested.

### *Claim Rejections -35 USC § 103*

In paragraph 1 of the Office Action, Claims 1-45 were rejected under 35 U.S.C. 103(a) as being unpatentable over Weiss: U.S. Patent No. 7,346,654 and in view of Curry et al. (hereinafter Curry): U.S. Patent Application Pub. No. 2003/0081115.

#### **INDEPENDENT CLAIM 1:**

Claim 1 will first be discussed.

#### ***1. The cited references and state of the art at cited references' priority dates***

- a. **Primary reference Weiss has a priority date 1999** and describes a virtual reality system with multiple users. A sense of location is determined using attenuation and distance.
- b. **Primary reference Curry has a priority date 1996** and describes a virtual teleconference room with multiple participants at a set of locations around a table.
- c. In the early 1990, it was well known how to sound localization in virtual reality. **Qsound of Calgary Canada** was founded in 1986 and was famous in the 1990's for its sound localization for virtual reality. See the Web archive of Qsound at [http://web.archive.org/web/\\*/http://www.qsound.com](http://web.archive.org/web/*/http://www.qsound.com). The Qsound room simulation technology can add reverberation effect by adding artificial random number generator or by adding reverberation to head-related transfer functions (HRTFs). The resulting impulse responses of the HRTFs—the response to the left and right ears—when reverberation is added are extremely long, making for difficulties in computation, especially in real time.

#### ***2. What is agreed is missing in Weiss***

Applicant successfully argued that:

- a. Weiss does not disclose or suggest: the headphone signals including **binauralized reverberant signals generated according to the combined stream.**
- b. Weiss does not suggest or disclose the **spatializing including HRTF processing to take into account the orientation and location of the particular user in the virtual user environment, and**

- c. Weiss does not suggest or disclose **HRTF processing to take into account direct sounds and early echoes, and reverberation according to a non-spatial combination of audio streams.**

***3. The Office asserts in the final Office Action:***

- a. The final rejection, the Office admits above elements 2.a, 2.b and 2.c are missing from Weiss, but asserts that including them is obvious in view of Curry. The Office for this cites Curry's paragraphs [0013] and Curry [0040]

***4. Claim 1:***

Claim 1 recites:

- a. An interactive spatialized audiovisual system for linking a plurality of remote user terminals, the system comprising:
- i. a processing system coupled to a network; and;
  - ii. an associated user database coupled to or part of the processing system, the user database including user data, including user status information for each corresponding user,
- b. wherein the processing system is configured to:
- i.1. receive a plurality of audio streams and associated locating data from the remote user terminals each audio stream corresponding to a user as a source of audio, the locating data for virtually locating the users relative to one another within a virtual user environment;
  - i.2. select at least one group of at least one of the plurality of audio streams based on status information in the user database, each group corresponding to one of the users,
  - i.3. combine at least some of the plurality of audio streams to form a combined stream, and
  - i.4. send to each of at least one of the remote user terminals via the network the respective selected group of audio streams and associated locating data corresponding to the user of the remote user terminal, and
  - i.5. send to the at least one of the remote user terminals via the network a function of the combined stream; the function possibly user dependent,
- iii. wherein, a particular remote user terminal coupled to the network and corresponding to a particular user is configured to:

- iii.1. receive the sent group of audio streams and the function of the combined stream;
- iii.2. display a visual representation of the virtual user environment, including representations of at least some of the users; and
- iii.3. convert the audio streams of the group corresponding to the particular user and the function of the combined stream to a pair of audio headphones signals **including binauralized reverberant signals generated according to the combined stream**,
- iv. wherein the converting includes spatializing the audio streams of the group such that the particular user, listening to the headphone signals over headphones, has the sensation that the audio streams of the group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user,
- v. wherein the spatializing includes **HRTF processing to take into account** the orientation and location of the particular user in the virtual user environment, and **to take into account direct sounds and early echoes**, and
- vi. (to take into account) **reverberation according to a non-spatial combination of audio streams**.

***5. Applicant asserts the following non-obvious elements are missing in Curry:***

Applicant asserts that:

- a. There is no teaching or suggestion in Curry of “binauralized *reverberant signals generated according to the combined stream*”
- b. There is no teaching or suggestion in Curry of “reverberation *according to a non-spatial combination of audio streams*.”
- c. There is no teaching or suggestion in Curry of “*to take into account direct sounds and early echoes*”

***6. Applicant's invention is non-obvious***

- a. Weiss (1999), being in the field of virtual reality, would have known about spatialization such as Qsound's famous method of using long HRTFs that include reverberation. Nevertheless, Weiss did not add such spatialization.
- b. There was thus a long felt need to add spatialization. How to add the spatialization in the context of virtual reality in, e.g., a multi-room gaming environment was non-obvious.

One reason is it is computationally too difficult to add HRTFs, e.g., long HRTFs that include reverberation. Hence Weiss has simple attenuation based spatialization.

- c. Applicants invention adds spatial cues such as reverberation, wet signals from dry signals, using combined stream with reverberation, using wet signals from dry combination for signals from doorway between rooms, *and so forth*. The features A), B) and C) above describe how to do this, but are missing in Curry.

### ***7. Reasoning for assertion: what is and is not in Curry (cited portions)***

- a. **Cited Paragraph [0012] of Curry** describes how spatial sound information may be captured using a dummy head at a conference table.
- b. **Cited Paragraph [0013] of Curry** describes what HRTF processing is, in particular how a computer-generated head-related transfer function convolved with a single audio signal creates left and right audio signals with a spatial sound component.
- c. **Cited Paragraph [0040] of Curry** describes a variety of additional features, in particular:
- i. adaptive or nonadaptive echo cancellation to reduce the effects of compression delays and other delays.
  - ii. reverberation settings to simulate various virtual room acoustics.
  - iii. or audio technique algorithms such as speaker crossover cancellation to optimize playback on spatially disposed loudspeakers as opposed to a headset.
- d. **Paragraph [0043] of Curry (not cited)** describes an AIN 355 may ... use information transmitted ... to allow participants to ...
- i. recreate *a particular conference room setting using acoustic and reverberation information*,
  - ii. *select a preferred virtual conference table size and shape, reserve a particular position at a virtual conference table*, and
  - iii. select a spatial sound conference bridge based on availability or cost, or handle the connection and disconnection of conference participants.

iv. Paragraph [0043] also states that because *certain head-related transfer functions may produce better spatial separation for different conference participants, AIN may be used to construct or select a preferred head-related transfer function for an individual participant.*

c. **Applicant asserts that** the HRTFs described in Curry do not include early echoes.

- i. At the time of Curry (1996), and what is meant by Curry's HRTF, is angular separation. Curry's HRTFs do not include room effects.
- ii. See, for example, Curry [0013] that defines HRTFs without mention early echoes.
- iii. See also 7.d.iv above that describes how Curry, in [0043] states that the purpose to achieve greater separation, admits he is after separation, suggesting angular separation.
- iv. See also all of Curry's drawings that have the participants distributed by angle around a conference table. There is no suggestion of anything but angular separation.
- v. In paragraph [0022], Curry teaches away from dealing with anything but separation, e.g., by stating: "The spatial sounds reproduced by the loudspeakers allow a listener to distinguish speech from background noise more easily, primarily because speech has a **recognizable point sound source** while background noise tends to emanate from multiple non-point sources or from locations other than the speaker point source." If Curry were to anticipate early reflections, these appear from multiple sources other than the point source of the sound source, i.e., from points along the walls and ceiling from where the reflection emanates. Hence with this statement, *Curry teaches away from early reflection.*
- vi. Early reflections are delayed components. In paragraph [0024], Curry describes delayed components, and *how to eliminate them by echo cancellation.* This also clearly *teaches away from introducing delayed signals that are the early reflection signals in a room.* Such early reflections are delayed signals that help create ambience, and that are needed to create the effect of distance. Hence in Applicant's invention, they would not be eliminated. Any delay in Curry is a problem delays that is to be eliminated.

- f. **Applicant asserts that** the HRTFs described in Curry if it includes reverberation, includes reverberation for each user using long HRTFs, but likely in the main preferred implementation described, does not include reverberation.
- i. The only description of reverberation is in paragraph 40, in a single phrase that the spatial sound conference bridge may also have a variety of additional features such as ... reverberation settings to simulate various virtual room acoustics. Paragraph [0043] adds that a participant may add reverberation information. **There is no description of how this may be achieved.** There certainly is no description of Applicant's non-obvious features of how to add reverberation as described above in 5.a, 5.b, and 5.c.: binauralized *reverberant signals generated according to the combined stream*; and reverberation *according to a non-spatial combination of audio streams*.
- ii. In Paragraph [0035], Curry states that the head-related transfer function unit 205 can be a signal processor, such as the Convolvotron available from Crystal River Engineering in Palo Alto, Calif. The Convolvotron was a NASA-developed commercially available system at the time of Curry's application that allowed HRTF processing to be performed on audio input signals, to achieve a "direction of arrival" effect. One could add room reverberation in the Convolvotron **for each HRTF**. These would need to be long HRTFs.
- iii. Thus, if Curry's does indeed include reverberation, there is required for each of these signals that are spatialized impulse responses that **are very long** and that therefore a computationally difficult to process. Unlike Weiss or Applicant's invention, Curry is for a conference, and does not include sources of sound that move. At the time of invention, it was impractical to incorporate such long HRTF impulse responses that include reverberation without using a non-obvious feature, such as described in Applicant's invention, such as adding reverberation according to **a non-spatial combination of some or all of the other audio streams**. There is not such teaching or suggestion in Curry. Again, see 5.a, 5.b, and 5.c above.
- g. *Hence Applicant have shown that the following non-obvious elements are missing in Curry and that adding them to Weiss in view of Curry would not lead to Applicant's invention.*

- i. There is no teaching or suggestion in Curry of “binauralized *reverberant signals generated according to the combined stream*” and Weiss in view of Curry does not make this feature obvious.
- ii. There is no teaching or suggestion in Curry of “reverberation *according to a non-spatial combination of audio streams*” and Weiss in view of Curry does not make this feature obvious.
- iii. There is no teaching or suggestion in Curry of “*to take into account direct sounds and early echoes*” and Weiss in view of Curry does not make this feature obvious.

Hence the Office has failed to make the case for rejection of claim 1 under 35 USC 103. The claim is patentable over Weiss in view of Curry. Reversal of the rejection and allowance of the claim are respectfully requested.

### **8. A further feature of claim 1 not in Curry**

- a. Note further that in claim 1, it is the participant remote station that is coupled to the network and that is configured to carry out the converting (iii.3). Such converting includes the reverberation processing of a particular type already shown to not be described in Curry.
- b. Any of the reverberant processing of Curry would be carried out, as asserted by the Office and described in [0033] and [0035], by a processor that received a plurality of audio streams. As stated in Curry [0033], “*the spatial sound conference bridge 200 receives a digital monaural signal via either B-channel from each conference participant station at ports 201, 202, 203, 204 connected to ISDN lines.*” This teaches away from the remote user terminal (unit 199 in Curry) being configured to carry out at least some of the spatialization.

Hence, for this reason as well, the Office has failed to make the case for rejection of claim 1 under 35 USC 103.

### **9. Conclusion for claim 1**

**Claim 1 is patentable over Weiss in view of Curry. Reversal of the rejection and allowance of the claim are respectfully requested.**

Similarly, each other independent claim is patentable over Weiss in view of Curry.



In particular.

**INDEPENDENT CLAIM 22:**

1. Independent claim 22 recites

- a. A method of operating a processing system in communication with a plurality of remote user terminals comprising:*
  - i. receiving a plurality of audio streams and associated locating data, each audio stream corresponding to a user as a source of audio, the locating data capable of virtually locating the audio sources relative to one another within a virtual user environment;*
    - i.1. determining user status data for one or more of the users;*
  - ii. selecting at least one group of at least one of the plurality of audio streams based on the user status data, each group corresponding to one of the users;*
  - iii. combining at least some of the plurality of audio streams to form a combined stream; and*
  - iv. transmitting to each of at least one of the remote user terminals the respective selected group of audio streams and associated locating data corresponding to the user of the remote user terminal ; and*
  - v. transmitting to the at least one of the remote user terminals a function of the combined stream; the function possibly user dependent,*
- b. wherein, a particular remote user terminal corresponding to a particular user is configured to:*
  - i. receive the transmitted group of audio streams and the function of the combined stream;*
  - ii. display a visual representation of the environment, including representations of at least some of the users; and*
  - iii. convert the audio streams of the group corresponding to the particular user and the function of the combined stream to a pair of audio headphones signals including binauralized reverberant signals generated according to the combined stream,*
- c. wherein the converting includes spatializing the audio streams of the group such that the particular user, listening the headphone signals over headphones, has the sensation that the audio streams of the group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user, and*

- d. wherein the spatializing includes HRTF processing to take into account the orientation and location of the particular user in the virtual user environment, and to take into account direct sounds and early echoes, and*
  - e. (to take into account) **reverberation according to a non-spatial combination of audio streams,***
  - f. wherein the combined stream is spatialized either before or after transmitting so as to provide a background audio effect within the virtual environment.*
2. Features b.iii and d. and e. are similar to features iii.3, v and vi, respectively, of above Section 4 of the description of claim 1. As described above for claim 1, the Office has failed to provide a prima facie case that Weiss in view of Curry makes these features obvious.
3. Furthermore, feature f is neither taught nor suggested by the cited references.
4. Hence independent claim 22 is allowable over the cited references, and allowance thereof is respectfully requested.

#### **INDEPENDENT CLAIM 28:**

##### **1. Independent claim 28 recites:**

- a. A user terminal for participating in a spatialized conversation in a network environment, the user terminal coupled to a computer network capable of streaming audio streams and associated spatialization information to the user terminal, the user terminal comprising:*
  - i. a rendering system configured to:*
    - i.1. accept a selected group of audio streams selected from a plurality of audio streams, each stream corresponding to a user at a user location in a virtual user environment to the user terminal;*
    - i.2. accept associated locating data for virtually locating the users associated with the group's audio streams relative to one another within the virtual user environment,*
    - i.3. accept a function of a combined stream formed by combining at least some of the plurality of audio streams; and*
    - i.4. convert the audio streams of the group and the function of the combined stream to a pair of audio headphones signals*
      - i.4.A. including **binauralized reverberant signals generated according to the combined stream,***

- i.4.B. wherein the converting includes spatializing the audio stream of the group such that the particular user, listening to the headphone signals over headphones, has the sensation that the audio streams of the group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user; and*
- iii. a user interface including a display configured to present a visual representation of the virtual user environment, including representations of at least some of the users.*
- iv. wherein the spatializing by the rendering system includes HRTF processing to take into account the orientation and location of the particular user in the virtual user environment, and*
- v. to take into account **direct sounds and early echoes**, and*
- vi. (to take into account) **reverberation according to a non-spatial combination of audio streams**.*
2. Features i.4.A, v and vi are similar to features iii.3, v and vi, respectively, of above Section 4 of the description of claim 1. As described above for claim 1, the Office has acknowledged that Weiss does not teach or suggest these features.
3. Also as described above for claim 1, Curry does not teach or suggest these features.
4. Furthermore, as argued above for claim 1, the Office has not made the required case that these features are obvious over Weiss in view of Curry. As argued above, these features are not obvious over Weiss in view of Curry.
5. Hence independent claim 28 is allowable over the cited references, and allowance thereof is respectfully requested.

### **INDEPENDENT CLAIM 33**

#### **Independent claim 33 recites**

- 1. A computer-readable medium having stored thereon executable instructions that when executed by one or more processors of a processing system in communication with a plurality of remote user terminals, cause implementing a method comprising:*
- a. receiving a plurality of audio streams and associated locating data, each audio stream corresponding to a user as a source of audio, the locating data capable of virtually locating the audio sources relative to one another within a virtual user environment;*
- b. determining user status data for one or more of the users;*

- c. selecting at least one group of at least one of the plurality of audio streams based on the user status data, each group corresponding to one of the users;*
- d. combining at least some of the plurality of audio streams to form a combined stream; and*
- e. transmit transmitting to each of at least one of the remote user terminals the respective selected group of audio streams and associated locating data corresponding to the user of the remote user terminal ; and*
- f. transmitting to the at least one of the remote user terminals a function of the combined stream; the function possibly user dependent,*
  - i. wherein, a particular remote user terminal corresponding to a particular user is configured to:*
    - i.1. receive the transmitted group of audio streams and the function of the combined stream;*
    - i.2. display a visual representation of the environment, including representations of at least some of the users; and*
    - i.3. convert the selected audio streams of the group corresponding to the particular user and the function of the combined stream to a pair of audio headphones signals,*
      - i.3.A. including **binauralized reverberant signals generated according to the combined stream,***
  - ii. wherein the converting includes spatializing the audio streams of the group such that the particular user, listening the headphone signals over headphones, has the sensation that the audio streams of the group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user, and*
  - iii. wherein the spatializing includes HRTF processing*
    - iii.1. to take into account the orientation and location of the particular user in the virtual user environment, and*
    - iii.2 .to take into account **direct sounds and early echoes,** and*
    - iii.3. (to take into account) reverberation **according to a non-spatial combination of audio streams,***
- F) wherein the combined stream is spatialized either before or after transmitting so as to provide a background audio effect within the virtual environment.*

2. Features i.3.A, iii.2, and iii.3 are similar to features iii.3, v and vi, respectively, of above Section 4 of the description of claim 1. As described above for claim 1, the Office has acknowledged that Weiss does not teach or suggest these features.
3. Also as described above for claim 1, Curry does not teach or suggest these features.
4. Furthermore, as argued above for claim 1, the Office has not made the required case that these features are obvious over Weiss in view of Curry. As argued above, these features are not obvious over Weiss in view of Curry.
5. Hence independent claim 33 is allowable over the cited references, and allowance thereof is respectfully requested.

### **INDEPENDENT CLAIM 35**

#### **1. Independent claim 35 recites:**

- A. A method of operating a particular user terminal that is part of an interactive spatialized audio facility including a networked computer and a plurality of user terminals linked to the networked computer, including the particular user terminal, the method comprising:*
  - i. transmitting from the particular user terminal to the networked computer an audio stream generated by a particular user and associated locating data capable of virtually locating the source of the audio stream generated by the user within a virtual environment, such that the networked computer can select groups of audio streams corresponding to each user, selectively combine at least some of the audio streams, for each group select associated locating data for the sources of the audio streams in the group, wherein the selecting is according to user status data available at the networked computer;*
  - ii. receiving at the particular user terminal a particular selected group of a plurality of audio streams selected on the basis of the user status data for the particular user, and further receiving associated locating data for virtually locating the sources of the group's audio streams relative to one another within a virtual user environment;*
  - iii. receiving at the particular user terminal a function of a combined audio stream formed by combining at least some of the plurality of audio streams corresponding to the users;*
  - iv. generating at the user terminal visual representations of the sources of the audio streams to indicate virtual locations of the sources in the virtual user environment, and*

- v. *converting the selected group of audio streams and the function of the combined stream to a pair of audio headphones signals*
    - v.1 *including binauralized reverberant signals generated according to the combined stream,*
    - v.2. *wherein the converting includes spatializing the audio stream of the group such that the particular user, listening to the headphone signals over headphones, has the sensation that the audio streams of the selected group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user, and ,*
  - vi. *wherein the spatializing includes HRTF processing*
    - vi.i. *to take into account the orientation and location of the particular user in the virtual user environment, and*
    - vi.2. *to take into account **direct sounds and early echoes,** and*
    - vi.3. *(to take into account) **reverberation according to a non-spatial combination of audio streams.***
2. Features v.1, vi.2, and vi.3 are similar to features iii.3, v and vi, respectively, of above Section 4 of the description of claim 1. As described above for claim 1, the Office has acknowledged that Weiss does not teach or suggest these features.
3. Also as described above for claim 1, Curry does not teach or suggest these features.
4. Furthermore, as argued above for claim 1, the Office has not made the required case that these features are obvious over Weiss in view of Curry. As argued above, these features are not obvious over Weiss in view of Curry.
5. Hence independent claim 35 is allowable over the cited references, and allowance thereof is respectfully requested.

#### **INDEPENDENT CLAIM 38**

1. Independent claim 38 recites:

- A. *A computer-readable medium having stored thereon executable instructions that when executed by a processor in a particular user terminal, cause carrying out of a method of operating the a particular user terminal, the user terminal being part of an interactive spatialized audio facility including a networked computer and a plurality of user terminals linked to the networked computer, including the particular user terminal,, the method comprising:*

- i. transmitting from the particular user terminal to the networked computer an audio stream generated by a particular user and associated locating data capable of virtually locating the source of the audio stream generated by the user within a virtual environment, such that the networked computer can select groups of audio streams corresponding to each user, selectively combine at least some of the audio streams, for each group select associated locating data for the sources of the audio streams in the group, wherein the selecting is according to user status data available at the networked computer;*
  - ii. receiving at the particular user terminal a particular selected group of a plurality of audio streams selected on the basis of the user status data for the particular user, and further receiving associated locating data for virtually locating the sources of the group's audio streams relative to one another within a virtual user environment;*
  - iii. receiving at the particular user terminal a function of a combined audio stream formed by combining at least some of the plurality of audio streams corresponding to the users;.*
  - iv. generating at the user terminal visual representations of the sources of the audio streams to indicate virtual locations of the sources in the virtual user environment, and*
  - v. converting the selected group of audio streams and the function of the combined stream to a pair of audio headphones signals*
    - v.1 including **binauralized reverberant signals generated according to the combined stream,***
    - v.2. wherein the converting includes spatializing the audio stream of the group such that the particular user, listening to the headphone signals over headphones, has the sensation that the audio streams of the selected group are emanating from their respective user locations in the virtual user environment relative to the location of the particular user, and ,*
  - vi. wherein the spatializing includes HRTF processing*
    - vi.1. to take into account the orientation and location of the particular user in the virtual user environment, and*
    - vi.2. to take into account **direct sounds and early echoes, and***
    - vi.3. (to take into account) **reverberation according to a non-spatial combination of audio streams.***
2. Features v.1, vi.2, and vi.3 are similar to features iii.3, v and vi, respectively, of above Section 4 of the description of claim 1. As described above for claim 1, the Office has acknowledged that Weiss does not teach or suggest these features.

3. Also as described above for claim 1, Curry does not teach or suggest these features.
4. Furthermore, as argued above for claim 1, the Office has not made the required case that these features are obvious over Weiss in view of Curry. As argued above, these features are not obvious over Weiss in view of Curry.
5. Hence independent claim 38 is allowable over the cited references, and allowance thereof is respectfully requested.

**The rejection of the independent claims is therefore believed in error. Reversal of the rejection and allowance of the claims is respectfully requested.**

#### **COMMENTS ON SOME OF THE REJECTIONS OF THE DEPENDENT CLAIMS**

While Applicants have shown the independent claims are patentable over the cited art, and hence all dependent claims are also allowable, it is worthwhile to point out some failures of the Office to show that the cited art renders obvious some of the claimed features.

#### **Claim 2.**

The Office acknowledges that Weiss fails to expressly disclose “the processing system is further configured to carry out at least part of the converting of the audio streams of each group of audio streams.”

The Office asserts that Curry in [0035] explicitly teaches this feature. [0035] describes the head related transfer function processor which is in the spatial sound conference bridge described in [0033]. Now claim 2 depends on claim 1 which states that the particular remote user terminal is configured to carry out converting. Therefore, **at least some of the converting is carried out in the particular remote user terminal**. The cited part of Curry states that **all of the processing is carried out in the spatial sound conference bridge** (which corresponds to the processing system of claim 1).

Hence Curry does not teach the feature of claim 2 dependent on claim 1, namely that the processing system is further configured to carry out part of the converting (but not **all** of the converting) of the audio streams of each group of audio streams.

Hence claim 2 is non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of independent claim 1.



### **Claim 3.**

The Office acknowledges that Weiss fails to expressly disclose: *the processing system is further configured to spatialize a reverberantly processed version of the combined stream such that the particular user listening to the headphone signals over headphones perceives a reverberant background formed from the combined stream.*

The Office however asserts that Curry makes this feature obvious.

See the arguments presented above for claim 1. This feature is not obvious over Weiss in view of Curry.

### **Claim 4.**

It is asserted that Weiss discloses in FIG. 10A and col. 10, lines 35–55 the “*sending of a group of audio streams to the particular user is in at least a partially spatialized form.*” The cited part of Weiss is repeated here for convenience:

*Turning to FIG. 10A, the eavesdropping of a third participant on the conversation of two other participants is illustrated using a directional sound distribution. In FIG. 10A, participant A is represented by avatar 1002 on a graphical user interface, which has a directional sound distribution represented by ellipse 1004. Likewise, participant B is represented by avatar 1006 which has a directional sound distribution represented by ellipse 1008. A third participant C which wishes to eavesdrop, represented by avatar 1010 is shown in four positions: C, C', C'' and C''' respectively. With avatar 1010 at position C'', neither participant A nor participant B are audible to participant C. At position C''', as avatar 1010 approaches avatar 1002, participant A becomes audible, but not participant B. With avatar 1010 at position C', participant B becomes audible, but not participant A. With avatar 1010 at position C, both participant A and participant B (i.e. the conversation) become audible as avatar 1010 is in the boundary defined by the intersection of the two sound distribution ellipses 1004 and 1008.*

There is no disclosure here of sending of a group in partially spatialized form.

The Office has failed to make the prima facie case that dependent claim 4 is anticipated. Hence claim 4 is non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of independent claim 1.

## **Claim 12.**

The Office has presented a new argument that uses FIG. 11 of Weiss. FIG 11 does show barriers. However, no reverberation processing of any sort is shown or suggested in Weiss. The Office in fact acknowledges that Weiss fails to disclose *“reverberation processing is performed to achieve a background reverberation effect characteristic of that particular room.”*

The Office erroneously asserts that Curry explicitly teaches *“reverberation processing is performed to achieve a background reverberation effect characteristic of that particular room.”*

While Curry in paragraph [0040] makes a general statement that reverberation is added, there is not disclosure of how this is achieved, and that in fact this is carried out to achieve background reverberation. Applicants do not see any specific teaching in Curry that addresses background. A prima facie case needs to show some reasoning or description of the claimed feature, other than a general statement about reverberation. As already explained above in arguing for claim 1, carrying out reverberation processing is not trivial, and applicant is specific about how this is achieved. See the above arguments presented for claim 1.

The Office thus has failed to make the prima facie case that dependent claim 12 is obvious over Weiss in view of Curry. Hence claim 12 is non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of independent claim 1.

## **Claims 13, 14, and 15.**

Claims 13, 14, and 15 have described generating background signals, including in claim 14, a “dry” signal for use as background for signals within a room or area, and in claim 15, a “wet” signal for use as background to account for signals from an adjoining room or area.

The Office claimed that Weiss teaches generating “wet” room signals using summed reverberated audio sources in FIG. 11 and col. 14, lines 40–60. Applicants remind the Office that “wet” signals are those from adjoining room and are processed by adding reverberation to a combination of the sound sources from the adjoining room. Weiss does not teach adding reverberation effects, but only attenuation.

With respect to claim 14, the Office acknowledges that Weiss fails to disclose “*the processing system is further configured to generate for the particular room or area an in-room signal representative of the background due to audio streams emanating from users within the particular room or area and optionally including a weighted reverberant version of any adjoining room signal emanating from users in any room adjoining the particular room or area, wherein said generating includes combining the audio streams emanating from users within the particular room or area and optionally a weighted reverberant version of the combined signals emanating from users in the room or rooms or area or areas adjoining the particular room or area.*”

The Office asserts that Curry teaches or makes obvious this feature. Applicants respectfully disagree. Curry only makes a general statement about reverberation in paragraph [0040]. There is no description of how this reverberation is carried out, and to what the reverberation is applied, or how it is applied. A prima facie case needs to show some reasoning or description of the claimed feature, other than a general statement about reverberation. As described above, one of ordinary skill in the art would see that Curry’s reverberation is by using long HRTFs. As already explained above in arguing for claim 1, carrying out reverberation processing is not trivial, and applicant is specific about how this is achieved. There is no disclosure or suggestion in Curry of the claimed features of

*“the processing system is further configured to generate for the particular room or area an in-room signal representative of the background due to audio streams emanating from users within the particular room or area and optionally including a weighted reverberant version of any adjoining room signal emanating from users in any room adjoining the particular room or area,” and*

*“wherein said generating includes combining the audio streams emanating from users within the particular room or area and optionally a weighted reverberant version of the combined signals emanating from users in the room or rooms or area or areas adjoining the particular room or area.”*

Hence the Office has failed to present a prima facie case against patentability of claim 14. Hence claim 14 is non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of parent claims to claim 14.

Similarly, with respect to claim 15, the Office acknowledges that Weiss fails to disclose “*the processing system is further configured to generate for the particular room or area a room signal representative of a reverberant version of the adjoining room signal*

*formed as a combining of the signals emanating from users in the room adjoining the particular room or area."*

The Office asserts that Curry teaches or makes obvious this feature. Applicant respectfully disagrees. Curry only makes a general statement about reverberation in paragraph [0040]. There is no description of how this reverberation is carried out, and to what the reverberation is applied, or how it is applied. A prima facie case needs to show some reasoning or description of the claimed feature, other than a general statement about reverberation. As described above, one of ordinary skill in the art would see that Curry's reverberation is by using long HRTFs. As already explained above in arguing for claim 1, carrying out reverberation processing is not trivial, and applicant is specific about how this is achieved. There is no disclosure or suggestion in Curry of the claimed features of

*"the processing system is further configured to generate for the particular room or area a room signal representative of a reverberant version of the adjoining room signal formed as a combining of the signals emanating from users in the room adjoining the particular room or area."*

Hence the Office has failed to present a prima facie case against patentability of claim 15. Hence claim 15 is non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of parent claims to claim 15.

### **Claims 24–26, 29-31, 34, 40-41, 36-37, 42, and 43-45**

As acknowledged by the Office, the subject matter recited in these claims corresponds to the subject matter recited in claims 13-15.

As argued above for claims 13–15, the Office has failed to present a prima facie case against patentability of these claims that have features similar to those of claims 14 and 15. Hence these dependent claims are each non-obvious over Weiss in view of Curry even if the Office remains unconvinced about the patentability of each of the respective parent claims.

### **Conclusion**

The Applicants believe all of Examiner's rejections have been overcome with respect to all remaining claims, and that the claims are allowable over the cited art. Action to that end is respectfully requested.

If the Examiner has any questions or comments that would advance the prosecution and allowance of this application, an email message to the undersigned at [dov@inventek.com](mailto:dov@inventek.com), or a telephone call to the undersigned at +1-510-547-3378 is requested.

Respectfully Submitted,

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Date

/Dov Rosenfeld/ #38687

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